UNITED STATES DEPARTMENT OF AGRICULTURE
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and

UNIVERSITY OF PUERTO RICO AGRICULTURAL EXPERIMENT STATION
Mayaguez, Puerto Rico

NOTICE OF RELEASE OF 'BADILLO' COMMON BEAN CULTIVAR

The University of Puerto Rico (UPR) Agriculture Experiment Station and the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), announce the release of common bean (Phaseolus vulgaris L.) cultivar 'Badillo,' with resistance to common bacterial blight [Xanthomonas axonopodis pv. phaseoli (Smith) Dye] and bean common mosaic virus (BCMV). This is the first light red kidney bean cultivar that combines resistance to these important diseases. Scientists participating in the development of Badillo were J.S. Beaver (UPR, Mayaguez, PR), T.G. Porch (USDA-ARS, Mayaguez, PR), and M. Zapata (UPR, Mayaguez, PR).

Badillo [UPR breeding line T-21 (PR0422-30)] was derived from the cross AFR 285 / PR9443-4. AFR 285 is a light red kidney bean breeding line from the Centro Internacional de Agricultura Tropical (CIAT) that was selected in Puerto Rico for local adaptation and commercial seed type. AFR 285 was derived from the cross G 6415 / XAN 43 (CIAT, 1995). PR9443-4 is a light red kidney bean breeding line developed and released by the University of Puerto Rico in collaboration with USDA-ARS with resistance to Bean Golden Yellow Mosaic Virus (BGYMV), BCMV (dominant I gene), rust and common bacterial blight (Beaver et al., 1999). PR9443-4 was derived from the cross T969-2 / DOR 303. T-969-2 is a light red kidney bean breeding line from Michigan State University and DOR 303 is a bean breeding line from CIAT. PR9443-4 and DOR 303 have the recessive gene bgm-2 for resistance to BGYMV (Beaver et al., 1999; Velez et al., 1998). The F1 nursery was planted at the UPR Isabela Substation in November 1998. Individual plants having desirable agronomic traits and light red kidney seed were selected from the F2 nursery which was planted at the Isabela Substation in November 1999. Pedigree selection was used in the F3 and F4 generations to identify plants with disease resistance and desirable agronomic and seed traits. The most promising F4:5 lines were bulked in a nursery planted at the Isabela Substation in November 2001.

In response to inoculation with the NL3 strain of BCMV in the greenhouse, Badillo had a lethal hypersensitive reaction that suggested the presence of the dominant I gene for resistance to BCMV. The presence of the I gene was confirmed using the SW13 SCAR marker. Badillo also has the SAP6 SCAR, but not the SU91 SCAR marker that are linked to independent QTL for common bacterial blight resistance.

When inoculated with Xanthomonas axonopodis pv. phaseoli strain 484a, Badillo had a mean leaf score of 2.2 and a mean pod score of 1.7 at 14 days after inoculation, significantly lower than

Redhawk (4.4) and not different from Montcalm (2.8) for the leaf score. When inoculated with Xcp strain 3353, Badillo had mean leaf scores at 14 days after inoculation of 3.7 for the first and 3.8 for the second evaluation, while the mean leaf scores for Montcalm (6.3, 6.2) and Redhawk (8.7, 8.0) were significantly higher in the first and second evaluation, respectively. The mean pod score for Badillo was 1.1 with strain 3353 and it did not present water-soaked lesions, while leaf scores for Redhawk (1.7) and Montcalm (1.2) were not significantly different, but Redhawk did present water-soaked lesions.

Badillo produced a five-year mean seed yield of 2392 kg ha-1 in the performance trials conducted at the Isabela Substation. The light red kidney bean breeding line PR9443-4 produced a mean seed yield of 1864 kg ha-1 in four of the five trials whereas the heat tolerant light red kidney line PR9920-171 produced a four-year mean seed yield of 1924 kg ha-1. The mean seed yield of Badillo over the same four-year period was 2220 kg ha-1. Badillo did not develop CBB symptoms on pods or leaves in field trials conducted at Isabela, Puerto Rico and was also resistant to endemic races of bean rust caused by Uromyces appendiculatus (Pers.) Unger.

Due to the recent decline in the incidence of BGYMV in Puerto Rico, it was not possible to determine if Badillo has the recessive gene bgm-2 for resistance to BGYMV. However, no plants of Badillo in the field trials were observed with BGYMV symptoms.

Badillo has an indeterminate, bush, Type II growth habit. Badillo flowers 33 d and matures 77 d after planting. Badillo has a kidney shaped seed with a mean seed weight of 42 g 100 seed-1. It has a light red seed coat color that is commercially acceptable in Puerto Rico and other Caribbean countries.

Small amounts of seed of Badillo may be obtained from the corresponding author (J.S. Beaver, Call Box 9000, Mayagüez, Puerto Rico 00681-9000, james.beaver@upr.edu). Plant variety protection will not be sought for this cultivar.

Signatures:

M.K Simons — 10/9/09

Deputy Administrator, Crop Production and Protection
Agricultural Research Service, U.S. Department of Agriculture — Date

9-24-09

Dean and Director
University of Puerto Rico Agriculture Experiment Station — Date